STRAND

DUET

V.D.U.

USER'S HANDBOOK

TECHNICAL INFORMATION

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Rank Strand

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DUET V.D.U.

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1. INTRODUCTION

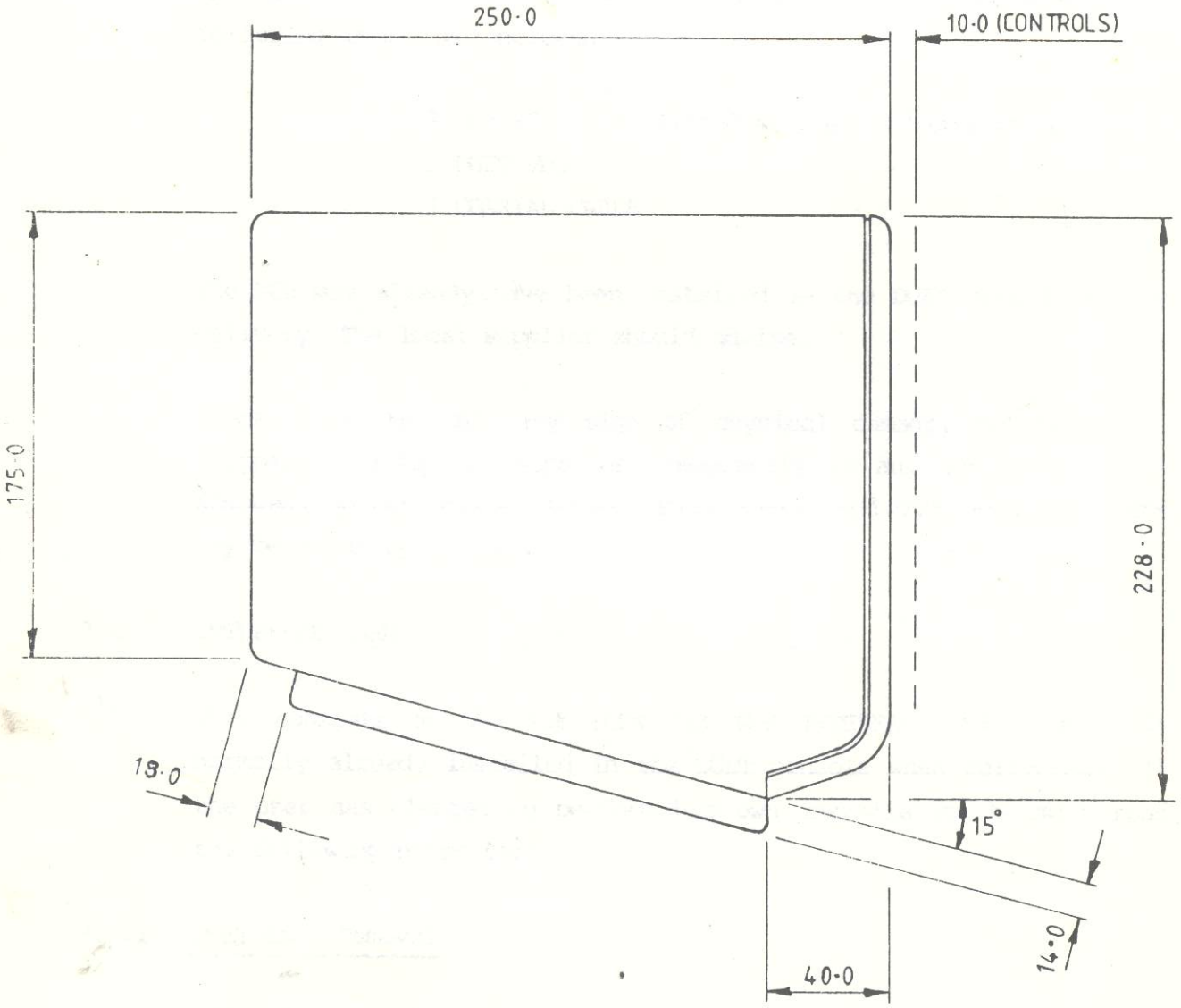
The DUET VDU consists of a 225mm video monitor, fitted in a case to match the DUET console and driven by an interface printed circuit board (PCB) in the DUET console. It provides a display of all the channels controlled by the DUET system, their levels on the stage/studio or in the memories, and a display of data appropriate to the DUET controls.

The DUET VDU is provided initially as a kit of VDU, interface PCB and connecting cables, but the installation of the PCB will normally be carried out by the local supplier and tested before delivery. In the case of DUET 2 systems, a VDU interface board is fitted during manufacture. The user need only make simple external connections to obtain a working system.

This handbook is intended to provide all the necessary detail to enable a competent technician to install, commission, use correctly and carry out first line adjustments and maintenance of the DUET VDU. For further circuit details and repair information to enable a trained electronics engineer to repair the VDU, a separate publication, the DUET System Maintenance Handbook is available, covering all parts of the system.

2. TECHNICAL SPECIFICATION

Mains input	110-120V or 220-240V AC
	47-63Hz
	40VA
Video Input	1V +/- 6dB Composite Sync
	Positive white
	Bridging or 75 ohm
	termination by switch
	75 ohm BNC Connector
	Bandwidth 50Hz to 10MHz +/- 3dB
	Black level Clamp
Scanning Standard	312 Line 50Hz
	(or 262 Line 60Hz switchable
	on Interface PCB)
	Non - interlace.
Environmental	0°C to 35°C Operating
	-25°C to +50°C Storage
	10% to 90% Relative Humidity
	(non-condensing)
	"Office" level cleanliness
Physical	Width 280mm
	Depth 250mm
	Height 242mm (max)
	Weight 7kg
	(see outline drawing over)



OVERALL WIDTH = 280·0

3. INSTALLATION

3.1 UNPACKING

The VDU kit is supplied packed in a cardboard carton with foam protection. Unpack carefully to avoid damage and retain the packing in case the unit needs to be returned for repair. Check the following items are enclosed :

1 Ref 1604 PCB (fitted as standard on DUET 2)
1 DUET VDU
1 COAXIAL CABLE

The PCB may already have been installed in the DUET console before delivery. The local supplier should advise.

Check each item for any sign of physical damage, notifying the shipping company and supplier immediately in any such event. If damaged, do not attempt to use until instructed otherwise, as there may be a safety hazard.

3.2 INTERFACE CARD

This consists of the Ref 1604 "2K VDU INTERFACE PCB", which is normally already installed in the DUET console when delivered. If the user has elected to perform his own installation he must read the following notes first.

3.2.1 DUET Case Removal

All references to front and rear of the system or its sub-assemblies apply to their position in relation to the operator when the system is fully assembled.

In order to carry out installation or maintenance work on the DUET, it is necessary to remove the PCBs and sub-assemblies located in both base and cover. Instructions for this are given below.

The base of the DUET desk is a metal chassis plate onto which are mounted the processor motherboard, power supply and card frame. The desk top DMC material is secured to the base by screws around the edge of the base. The desk top carries some sub-assemblies which interconnect with the processor motherboard via ribbon cabling.

Case top removal :

Note that this operation will require a clear working area in excess of twice the base area of the DUET desk. Two persons ease the task of lifting the desk.

Disconnect all peripheral units and dimmer lines from the DUET and clear the working area.

DISCONNECT THE MAINS POWER CORD FROM THE SOURCE OF SUPPLY.

Place a piece of sponge or other protective material, equal in area to the DUET, beside the desk. With one person at the front and one at the rear of the desk, turn the desk over onto the protective material to expose the underside of the base plate. Remove the twelve case securing screws which are located at intervals around the edge of the base section.

Having removed the screws, turn the DUET back the right way up, holding the case top securely to the base while doing so.

Position the DUET in the working area to provide a clear space to the left of the desk as this is the direction in which the case top will be removed. Place protective material on this area. Depress the two catches on the side of the case (if fitted) then lift the front of the case top slightly and move the whole top rearwards by about 3 cm to clear the rear panel connectors.

The top can then be lifted clear of the base unit. Take note of the ribbon cables. Place the desk top on its side to the left of the base unit. Do not attempt to turn the case top completely over until the interconnecting cables have been removed. Note that access to the base unit will not require complete removal of the case top.

3.2.2 PCB Installation

Having removed the case top, insert the Ref 1604 PCB into the guides for slot 6 in the rear card frame, with the components facing the same way as the other PCBs. Push home gently into the connector. Should this slot be already occupied, use any other vacant slot between 1 and 5.

N.B. Slot 1 is on the right hand side when viewed from the front.

A twisted pair (green/white) cable will be found coming from the VDU socket on the rear panel, tied to restrain it. Cut the tie and plug the small connector onto the plug at the rear of the PCB, then tidy the cable run.

Refit the DUET case top by reversing the removal instructions, paying particular attention to preventing the flat cables being caught in the fixings or wheel mechanism.

3.3 MAINS CONNECTION

The power cable should be connected to mains supply as specified on the rear of the VDU, either 110-120V or 220-240V AC.

If the local supply is incorrect, it is necessary to exchange the VDU for one correctly wired for the supply, as no user alterable switching is provided. The power cable conductors are colour coded thus :

Brown	- Live
Blue	- Neutral
Green/Yellow	- Earth

It is imperative that a continuous and adequate Earth connection is provided. The cable has 1.25 mm^2 conductors and should be protected by a maximum fuse rating of 13A. The VDU is internally protected by a fuse mounted on the rear. If this fails it must be replaced by one of identical rating, i.e.

110-120V	2A, Anti-surge, 20 mm
220-240V	1A, Anti-surge, 20 mm

3.4 VDU CONNECTION

The co-axial cable supplied should be used to connect from the VDU connector on the rear of the DUET console to the VIDEO connector on the rear of the DUET VDU. The adjacent switch should be set to 75R.

4. TESTING

Apply power and switch on the DUET console and VDU, allowing about 30 seconds for the VDU to warm up. The VDU brightness and contrast controls should be set initially to mid-way.

Check that a stable picture is obtained, and adjust the above controls as described in section 5.1. Check that the picture, as described in section 5.2, is adequately centred and that no parts are cut off.

5. OPERATION

5.1 CONTROLS

Two controls are provided on the front panel: Brightness and Contrast. Adjust the brightness control until the background of the display is just black, then adjust the contrast to provide the correct visibility of the data.

5.2 DISPLAY

This consists of a picture area which can display up to 1,536 alphanumeric characters on a T.V. screen. The screen is divided into two sections, the top three quarters giving channel level information, while the bottom quarter provides details of DUET control panel operations.

In the top section, the top line describes the source of channel information, i.e. playback store, output or memory. The remainder of the section is organised into lines of 20 channels, up to the maximum number of channels in the system. Each line has the channel number dimly displayed if Off, and brightly displayed if On. The channel level in % (01-99, F) is displayed brightly below its number if On, and both channel number and level are displayed as a reversed black on white image if under control of the channel control.

The lower section of the screen is partitioned in a similar manner to the main desk panel, with sections for channel, memory, A,B and T playback stores. The CHANNEL section displays the channel number (CHANNEL ...), flashing if invalid, it's level in the selected store being controlled or output, and a display of the wheel movement (MASTER ...%) showing amount of change. The MEMORY section displays the current memory number (MEM ...) flashing if invalid and the last recorded memory number (REC ...) only displayed (dimly) when the record keyswitch is on. Below is the recorded sequence memory number (LINK ...) and recorded time (TIME minutes : seconds).

The A and B playback stores section show the latest memory transferred to A and B (MEM ...) the direction of the crossfade (A to B or B to A) and the position of the crossfaders (...%). The T playback store section also shows the latest memory number (MEM ...) transferred to T, the time of the current fader (TIME minutes : seconds) with flashing asterisks if stopped, and the fade progress (...%).

6. MAINTENANCE

6.1 IMPORTANT NOTES

There is no need for routine maintenance of the DUET VDU if it is kept and used in a relatively clean environment. It may however be felt necessary to dismantle the equipment very occasionally to clean the inside display surfaces and re-adjust the unit. It is strongly recommended however that all servicing should be entrusted to the local Service Agent, who has the necessary training, service equipment and spares to carry out efficient repairs.

WARNINGS :

i) Inside the DUET VDU there are very high voltages, which can persist even after power is removed. Only a qualified electrican, preferably with T.V. experience, should obtain access to the interior.

ii) Do not unplug any connectors in the VDU when power is applied.

iii) Read the relevant section of this handbook before attempting any dis-assembly.

6.2 FAULT DIAGNOSIS

The following trouble-shooting hints are provided to aid a technically competent user perform simple maintenance.

* means consult your local Service Agent.

FAULT		POSSIBLE CAUSE	ACTION
No picture or light on screen	i.	Mains power missing or fuse blown	Restore or replace
	ii.	Failure of monitor chassis or power supply chassis	*Replace
No picture but lit screen and console functions normally	i.	Break in co-axial VDU cable	Repair cable
	ii.	If vertical pattern appears on screen when co-axial cable disconnected and switch set to O/C, then signal is faulty from DUET console	*Replace Ref 1604 DUET Interface PCB in DUET console
	iii.	If no pattern appears then chassis is faulty	*Replace monitor chassis in VDU
Picture rolling vertically or tearing horizontally		Monitor horizontal and vertical hold adjustments wrong.	Re-adjust
Picture misplaced		Monitor horizontal hold and picture centring adjustments wrong	Re-adjust
Incorrect data displayed but DUET console operates normally		Interface PCB faulty	*Replace Ref 1604 VDU Interface PCB in DUET console

6.3 ADJUSTMENTS

On early units it is necessary to remove the case of the unit (see section 6.4) for all adjustments except brightness and contrast. On later models, the majority of these may be made via small access holes in the bottom of the unit.

The monitor must ,of course, be operating when making adjustments. If the case has been removed, great care must be taken, because of the high voltages present.

6.3.1 Contrast (◑)

This is a front panel control which should be adjusted as described in section 5.1.

6.3.2 Brightness (☼)

This is a front panel control which should be adjusted as described in section 5.1.

6.3.3 Vertical Hold (P3)

This should be set so that it is in the middle of the range which "locks" the picture vertically. On later units, this control is labelled F. HOLD.

6.3.4 Height (P4)

This should be adjusted to produce a suitable picture height.

6.3.5 Vertical Linearity (P5)

This should be adjusted to give the best picture linearity with a "graticule" input signal. On later units, this control is labelled F. LIN.

6.3.6 Horizontal Frequency/Hold (P6)

This control (labelled L. HOLD on later units) should be set so that the picture is "soft locked" horizontally. On earlier units it is best adjusted with a temporary short circuit across R41.

6.3.7 Focus (P12)

On earlier units, this control is located on the tube base board. Adjust to give good focus at the corners of the picture.

There is no focus control on later units.

6.3.8 Shift (later units only)

The SHIFT control should be adjusted to obtain a central horizontal picture position.

6.3.9 Centering the Picture

On earlier units, the picture may be centered by adjusting two ring magnets fitted to the rear of the scan coil assembly on the rear of the scan coil assembly on the neck of the picture tube. These can be rotated individually or together as required. The effect is to move the picture both vertically and horizontally simultaneously. Adjust by trial and error until the desired picture position is obtained.

6.3.10 Picture Geometry

Adjustments have been made in manufacture by fitting small magnets to the scan coil assembly. If disturbed, these should be adjusted by trial and error, to regain the best rectangular shape of picture possible. These adjustments should only be attempted on earlier units.

6.4 REMOVING THE CASE

This should only be carried out by a qualified electrician.

DISCONNECT THE VDU POWER CABLE FROM THE MAINS SUPPLY

Remove the co-axial cable connection and then place the unit face down on a piece of foam to protect the perspex screen. Remove the four screws on the underside and lift off the case, allowing the trailing mains cable to pass through the cutout. Then return the unit to the upright position, and support the chassis to prevent the front panel touching the work bench.

It is now possible to re-adjust the monitor (earlier units) and replace faulty components in the power supply. No attempt should be made to remove the front panel (especially if it is secured with four screws), unless it is necessary to replace the monitor, as this has been prealigned at manufacture. If possible, the unit should be returned to the Service Agent for repair.

6.5 MONITOR CHASSIS REPLACEMENT(Earlier Units Only)

Remove the knobs which are secured by grub screws. Then remove the front panel by undoing the two screws on either side of the chassis which hold the front panel brackets and the potentiomemter mounting bracket.

Unplug the connector on the rear of the monitor from the power supply. Finally remove the four screws and two nuts on the base of the monitor (access is by the large slots each side of the chassis) and remove the chassis along with the potentiometer mounting bracket.

When replacing a monitor unit with a spare without external brightness and contrast controls the preset potentiometers for brightness and contrast should be unsoldered from the PCB and replaced by the six wires to the potentiometers brought out to the front panel.

An early design change (tube lengthened) means that a later monitor chassis will not fit an early case. Either obtain a spare of the correct type, or better still, exchange the whole unit including case.

On later units with externally accessible adjustment potentiometers, the complete unit should be returned to the Service Agent for repair.

6.6 REASSEMBLY

This is the reverse of the dis-assembly procedure with the exception that, when replacing the front panel, it is necessary to get the correct angle to match the case. On front panels fitted by two screws each side, the correct angle should be found by trial and error. Front panels fixed by only one screw each side, should be left slightly loose when initially offered up, then tightened after the panel has been adjusted to the correct angle.